

Notice of Allowability

Application No.

10/697,820

Examiner

Kuen S. Lu

Applicant(s)

COCHRAN ET AL.

Art Unit

2167

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/21/2007.
2. ☒ The allowed claim(s) is/are 1-5, 7-13 and 15-32 (renumbered to 1-30).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 5/30/2007.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 21, 2007 has been entered.

2.1. This action is responsive to Applicant's Amendment filed March 21, 2007. It is acknowledged that claims 1, 9, 17, 22, 26 and 28 were amended and claims 6 and 14 were canceled.

2.2. After a thorough search and examination of the present application, and in light of the prior art made of record, Applicant's Amendment and Remarks filed March 21, 2007 and Examiner's amendments made on May 30, 2007, Claims 1-5, 7-13 and 15-32 (renumbered to 1-30) are allowed.

Examiner's Amendments

3. Authorization for this Examiner's amendment, listed below, was given in telephone interview with Applicant, Mr. Ken J. Koestner (Registration 33,004) on May 30, 2007 for amending claims 1-2, 4-5, 8-13, 15-22 and 28. The summary of interview conducted on May 30, 2007 is attached.

3.1. Please amend Claims 1-2, 4-5, 8-13, 15-22 and 28 as follow:

1. (Currently Amended): A database system for executing a database application that transfers a logical object in multiple fragments comprising:

- a main storage site;

- a remote storage site that links to the main storage site, receives and stores mirror information from the main storage site, and comprises a storage and a cache sidefile divided into a plurality of array sidefile recordsets;

- a main protocol ~~executable~~ executing on the main storage site that transfers the logical object in multiple fragments in combination with information indicative of the logical object multiple fragments commencement and completion in ~~the~~ a multiple fragment database application transfer comprising:

 - receiving an application request to write the logical object of a specified length to a specified virtualized storage address;

 - converting ~~the~~ a virtualized write address and resolving the transfer length to designate at least one physical address in at least one physical storage device for transferring the logical object in fragments;

 - sending a first control message to the at least one physical storage device identifying the start of ~~a~~ the logical object to be held in a remote minor cache for destaging; and

 - sending a second control message identifying the end of the logical object so that the mirror cache is destaged to the at least one physical storage device, no portion of the logical object multiple fragments being otherwise destaged; and

a remote protocol ~~executable~~ executing on the remote storage site that controls the cache sidefile to cache the multiple fragments as received and to destage the logical object to the storage on receipt of all fragments.

2. (Currently Amended): The database system according to Claim 1 wherein:

the main protocol includes the information indicative of the logical object multiple fragments commencement and completion using a technique selected from among a group consisting of:

(1) explicitly sending a start control message preceding the multiple fragments and an end control message concluding the multiple fragments, and

(2) implicitly determining either a the start control message or ~~an~~ the end control message.

4. (Currently Amended): The database system according to Claim 1 wherein the main protocol further comprises: an address translation process that resolves a the virtual write address of the database application into a pick list of actual physical media writes associated with the logical object.

5. (Currently Amended) The database system according to Claim 1 wherein the main protocol further comprises:

a process ~~adapted to create~~ creating a control message for communication to the remote protocol that instructs individual physical storage elements to operate on the

multiple physical writes as a single object entity so that all or none is destaged to the storage.

8. (Currently Amended): The database system according to Claim 1 wherein:

the logical object multiple fragments are ~~controllably~~ destaged in ~~[[all-or-none]]~~ all or none fashion to all devices in a consistency group.

9. (Currently Amended): An article of manufacture comprising:

a controller ~~usable~~ readable storage medium having a computable readable program code embodied therein for executing in a database system that runs a database application for mirroring a logical object in multiple fragments from a main storage site to a remote storage site; the computable readable program code further comprising:

a code ~~configured to cause~~ causing the controller to interface with the database application that links and mirrors data between the main storage site and the remote storage site, the remote storage site including a storage and a cache sidefile divided into a plurality of array sidefile recordsets;

a code ~~configured to cause~~ causing the controller to create and deploy the logical object in multiple fragments in combination with control information indicative of the logical object multiple fragments commencement and completion in ~~the~~ a multiple fragment database application transfer;

wherein the control information controlling the cache sidefile to cache the multiple fragments as received and to destage the logical object to the storage on receipt of all fragments;

a code ~~adapted to receive~~ receiving application request to write the logical object of a specified length to a specified virtualized storage address;

a code ~~adapted to convert~~ converting the a virtualized write address and resolving the transfer length to designate at least one physical address in at least one physical storage device for transferring the logical object in fragments;

a code ~~adapted to send~~ sending a first control message to the at least one physical storage device that delineates the start of a the logical object that is to be held in a remote mirror cache for destaging; and

a code ~~adapted to send~~ sending a second control message that delineates the end of the logical object so that the mirror cache is destaged to the at least one physical storage device, no portion of the logical object multiple fragments being otherwise destaged.

10. (Currently Amended): The article of manufacture according to Claim 9 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to create~~ creating control information indicative of the logical object multiple fragments commencement and completion using a technique selected from among a group consisting of:

(1) explicitly sending a start control message preceding the multiple fragments and an end control message concluding the multiple fragments, and

(2) implicitly determining either a the start control message or an the end control message.

11. (Currently Amended): The article of manufacture according to Claim 9 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to translate~~ translating a logical address to a list of physical addresses.

12. (Currently Amended): The article of manufacture according to Claim 9 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to resolve~~ resolving a the virtualized write address of the database application into a pick list of actual physical media writes associated with the logical object.

13. (Currently Amended): The article of manufacture according to Claim 9 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to create~~ creating a control message for communication to the remote protocol that instructs individual physical storage elements to operate on the multiple physical writes as a single object entity so that all or none is destaged to the storage.

15. (Currently Amended): The article of manufacture according to Claim 9 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to replicate~~ replicating information from the main storage site to the remote storage site using a technique selected from among a group including:

- (1) synchronous data replication and
- (2) asynchronous data replication.

16. (Currently Amended): The article of manufacture according to Claim 9 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to controllably destage~~ destaging the logical object multiple fragments in ~~[[all-or-none]]~~ all or none fashion to all devices in a consistency group.

17. (Currently Amended): An article of manufacture comprising a controller ~~usable~~ readable storage medium having a ~~computable~~ computer readable program code embodied therein for executing in a database system that runs a database application for mirroring a logical object in multiple fragments from a train storage site to a remote storage site, the computable readable program code further comprising:

a code ~~executable~~ that executes at the remote storage site ~~configured to cause~~ causing the controller to receive the logical object in multiple fragment transfers in combination with control information indicative of the logical object multiple fragment commencement and completion;

a code ~~executable~~ that executes at the remote storage site ~~configured to cause~~ causing the controller to control storage of the logical object multiple fragments in a cache sidefile divided into a plurality of array sidefile recordsets;

a code ~~executable~~ that executes at the remote storage site ~~configured to cause~~ causing the controller to receive first and second control messages from a main storage site identifying respective start and end of the logical object; and

a code ~~executable~~ that executes at the remote storage site ~~configured to cause~~ causing the controller to cache the multiple fragments as received and to destage the logical object to the storage on receipt of all fragments according to the first and second control messages.

18. (Currently Amended): The article of manufacture according to Claim 17 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to determine~~ determining the logical object multiple fragments commencement and completion using a technique selected from among a group consisting of:

- (1) receiving explicitly identified starting and ending fragments, and
- (2) deriving either of the starting fragment and the ending fragment implicitly from received control information.

19. (Currently Amended): The article of manufacture according to Claim 17 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~configured to cause~~ causing the controller to track order of fragment updating between the main storage site and the remote storage site including updating of the sidefile recordsets.

20. (Currently Amended): The article of manufacture according to Claim 17 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to replicate~~ replicating information from the main storage site to the remote storage site using a technique selected from among a group including:

- (1) synchronous data replication and
- (2) asynchronous data replication.

21. (Currently Amended): The article of manufacture according to Claim 17 wherein the ~~computable~~ computer readable program code further comprises:

a code ~~adapted to controllably destage~~ destaging the logical object multiple fragments in ~~[[all-or-none]]~~ all or none fashion to all devices in a consistency group.

22. (Currently Amended): A controller readable storage element ~~readable by a controller~~ tangibly embodying a program of instructions therein ~~executable by the controller~~ that the controller executes to perform method acts for executing in a database system that runs a database application for mirroring a logical object in multiple fragments from a main storage site to a remote storage site, the method acts comprising:

receiving the logical object at the remote storage site in multiple fragment transfers in combination with control information indicative of the logical object multiple fragments commencement and completion;

controlling storage of the logical object multiple fragments at the remote storage site in a cache sidefile divided into a plurality of array sidefile recordsets;

receiving at the remote storage site first and second control messages from a main storage site identifying respective start and end of the logical object;

caching the multiple fragments at the remote storage site as received; and

destaging the logical object at the remote storage site to the storage on receipt of all fragments according to the first and second control messages.

28. (Currently Amended): A controller readable storage element ~~readable by a controller~~ tangibly embodying a program of instructions ~~therein executable by the controller that~~ the controller executes to perform method acts for executing in a database system that runs a database application for mirroring a logical object in multiple fragments from a main storage site to a remote storage site, the method acts comprising:

interfacing with the database application that links and mirrors data between the main storage site and the remote storage site, the remote storage site including a storage and a cache sidefile divided into a plurality of array sidefile recordsets;

deploying from the main storage site the logical object in multiple fragments in combination with control information indicative of the logical object multiple fragments

commencement and completion in the a multiple fragment database application transfer;

wherein the control information controlling the cache sidefile to cache the multiple fragments as received;

receiving an application request to write the logical object of a specified length to a specified virtualized storage address;

converting the a virtualized write address and resolving the transfer length to designate, at least one physical address in at least one physical storage device for transferring the logical object in fragments;

sending a first control message to the at least one physical storage device identifying the start of a logical object To be held in a remote mirror cache for destaging;

sending a second control message identifying the end of the logical object so that the mirror cache is destaged to the at least one physical storage device, no portion of the logical object multiple fragments being otherwise destaged; and

destaging at the remote storage site the logical object to the storage on receipt of all fragments according to the first and second control messages.

Reasons For Allowance

4. The following is an examiner's statement of reasons for allowance:

In the Examiner's Office Action for Final Rejection of November 21, 2006, Examiner's Claim rejection under 35 U.S.C. §103(a) is primarily based on Baird: Oracle 8i Data Guard Concepts, Administration, and Installation Guide, Release 3.0, October 2001,

Oracle®, hereafter “OraDgd”; and in view of Bobrowski et al.: Oracle7™ Server Concepts, Release 7.3, February 1996, Oracle®, hereafter “Ora734”.

After further consideration of Applicant's and Examiner's amendments made to the claims, Examiner is persuaded that the mostly recently amended claims 1, 5, 8-13, 15-22 and 28 where the combined subject matter as highlighted below or similar subject matter as described in each of independent claims 1, 9, 17, 22 and 28 is distinct from prior art cited.

transferring the logical object in multiple fragments in combination with information indicative of logical object multiple fragments commencement and completion in a multiple fragment database application transfer comprising... receiving an application request to write the logical object of a specified length to a specified virtualized storage address; converting a virtualized write address and resolving the transfer length to designate at least one physical address in at least one physical storage device for transferring the logical object in fragments; sending a first control message to the at least one physical storage device identifying the start of a logical object m be held in a remote mirror cache for destaging; and sending a second control message identifying the end of the logical object so that the mirror cache is destaged to the at least one physical storage device, no portion of the logical object multiple fragments being otherwise destaged.

An updated search for the prior art on EAST database and on domains (NPL-ACM, Google, NPL-IEEE) has been conducted. The prior art searched and investigated in the database and domains does not fairly teach or suggest the teaching of the newly amended claimed subject matter as combined and described in each of the independent claims 1, 9, 17, 22 and 28.

The dependent claim(s) in the groups (2-5, 7-8), (10-13, 15-16), (18-21), (23-27) and (29-32), depending directly or indirectly upon claims 1, 9, 17, 22 and 28, respectively, are also distinct from the prior art for the same reason.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

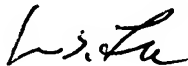
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kuen S. Lu whose telephone number is (571) 272-4114. The examiner can normally be reached on Monday-Friday (8:00 am-5:00 pm). If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, John Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 703-

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305-3900.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for Page 13, published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 703-305-3900 (toll free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, please call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kuen S. Lu,



Patent Examiner, Art Unit 2167

June 1, 2007